Paradise VGA Plus™ Card

A video graphics card that interfaces with VGA, EGA, CGA, Hercules* and MDA standards plus 800 × 600 graphics and 132 column support.

PARADISE™
A Western Digital Company

FCC Notice:

Certified to comply with the limits for a Class B computing device pursuant to Subpart J of Part 15 of FCC Rules. See instructions if interference to radio reception is suspected.

WARNING: This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with manufacturer's instructions, may cause interference with radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the computer with respect to the receiver.
- Move the computer away from the receiver.
- Plug the computer into a different outlet so that the two devices are on different branch circuits.
- If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.
- The user may find the following booklet prepared by the Federal Communications Commission helpful:
  "How to Identify and Resolve Radio-TV interference problems".
  This booklet is available from the U.S. Government Printing Office, Washington, DC 20402,
  Stock No. 004-000-00345-4

Please note: In order for an installation of this product to maintain compliance with the limits for a Class B device, shielded cables must be used for the connection of any devices external to this product.

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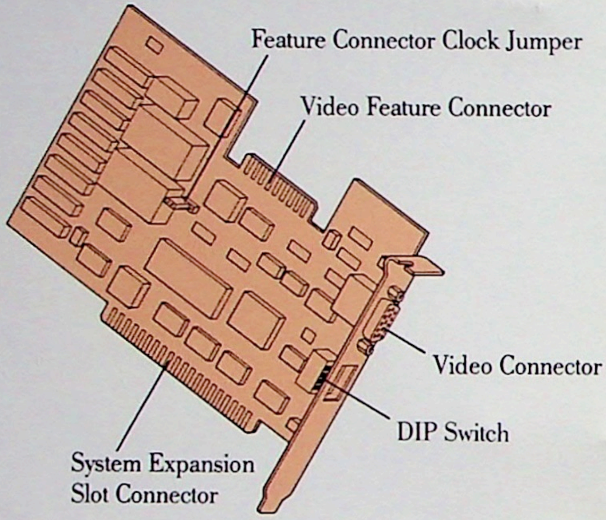
Paradise VGA Plus Card User's Guide

For IBM* PC/XT/AT* and Compatible Computers and IBM Personal System/2* Models 25 and 30


Feature Connector Clock Jumper
Video Feature Connector
Video Connector
DIP Switch
System Expansion Slot Connector

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Microsoft is a registered trademark of Microsoft Corporation

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79-000259-001

The Paradise VGA Plus Card

The Paradise VGA Plus Card brings the functions and features of the latest video standards to your current IBM compatible computer system. You get:

- All of the capabilities of the IBM Personal System/2 VGA Display Adapter.
- BIOS level compatibility with the MCGA video standard of the IBM PS/2* Model 30 and the IBM EGA standard.
- Extended resolution graphics provide 800 × 600 resolution with supporting software drivers on multi-frequency displays.
- 132 column text modes and supporting software drivers.
- Full compatibility with software written for the IBM Color/Graphics Adapter, the IBM Monochrome Display Adapter and the Hercules* Graphics Card.
- The capability to drive the IBM Personal System/2* analog video displays, models 8503, 8512 and 8513, as well as equivalent compatible displays.
- All these capabilities in a card that fits in a short expansion slot.

We know you will enjoy many years of service from your Paradise VGA Plus Card. If you ever need help with the installation or use of your Paradise VGA Plus Card:

1. Double check this manual. Many times, the answers you need are right here.
2. Contact your dealer. He is your best source of information.

If you call or write us regarding your Paradise VGA Plus Card installation, please supply or have the following information ready: the name of the Paradise product in question, the brand and model of computer in which it is installed, configuration details including the amount of memory in the system and all other adapter cards in the system, the current switch/jumper settings for both the system board and the Paradise product and the serial number from your VGA Plus Card. (Please refer to the following section "Layout of your Paradise VGA Plus Card" for information on locating the product's serial number.) You may write or call us at:

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99 South Hill Drive
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Telephone (415) 468-7300
Fax: (415) 468-7323/(415) 468-7324

About The Paradise VGA Plus Card User's Guide

We want you to get your Paradise VGA Plus Card up and running fast. This manual is written with this goal in mind.

We have taken the liberty of using several acronyms where appropriate to keep you from having to read long product names or phrases over and over again. Unavoidably, we have had to use several technical concepts and/or terms. We will keep these to a minimum. If you don't understand a term or concept, chances are that it is explained in the glossary contained in Appendix B of this manual.

If the Paradise VGA Plus Card is the only video card in your system, proceed with the installation as described in the following sections.

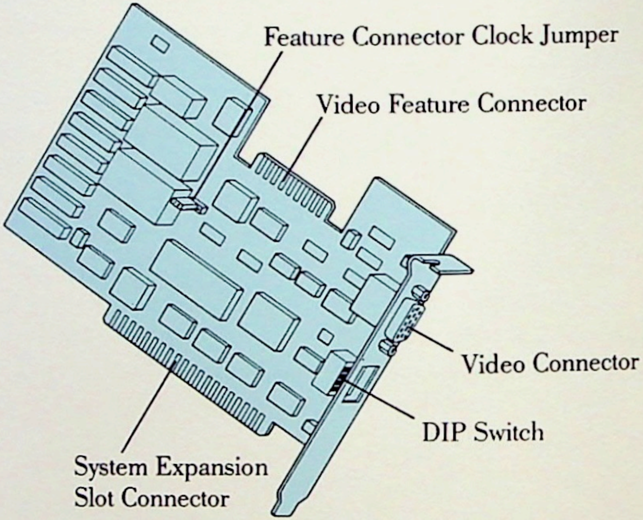
If you don't know what kind of monitor you will be using, please refer to the glossary in Appendix B of this manual. It explains the capabilities of the monitors supported by the Paradise VGA Plus Card.

If the Paradise VGA Plus Card will be installed with another video card, please refer to Appendix A of this manual for information specific to your installation.

Also included with the Paradise VGA Plus Card is the *Paradise VGA Plus Card Software Guide.* This manual describes the use and installation of software that supports the Paradise VGA Plus Card's extended resolution graphics mode and 132 column text modes.

Layout of the Paradise VGA Plus Card

The figure below shows the features of the Paradise VGA Plus Card. Study it and make sure that you can identify these items. They will be referenced throughout this manual. The following paragraphs briefly describe the function of each item called out in the illustration.


Feature Connector Clock Jumper
Video Feature Connector
Video Connector
DIP Switch
System Expansion Slot Connector

- ***DIP Switch:*** The Paradise VGA Plus Card is fitted with a four lever DIP switch. These switches are used to tell the Paradise VGA Plus Card information about your configuration. Refer to the installation section later in this manual for information on using these switches.
- ***Video Connector:*** This 15 pin socket is where you connect all monitors supported by the Paradise VGA Plus Card.
- ***Video Feature Connector:*** This edge connector and associated circuitry is equivalent to the connector provided by IBM on their PS/2 Display Adapter. Its purpose is to allow for possible future connections and is provided on your Paradise VGA Plus Card to maintain complete compatibility with the IBM card. You will normally have no need to use this connector.
- ***Feature Connector Clock Jumper:*** This jumper is provided to allow your board to use the clock input from the Video Feature Connector. The factory setting over pins 1 and 2 allows support of 800 by 600 graphics and 132 column text modes. The other position over pins 2 and 3 disables 800 by 600 graphics and 132 column text modes and provides full support for all the signals on the Video Feature Connector. The Feature Connector Clock Jumper should be left in the factory setting on pins 1 and 2 for normal operation of the card.
- ***System Expansion Slot Connector:*** This is the connector that plugs into the expansion slot in your computer system. It is through this connector that the computer "talks" to your Paradise VGA Plus Card.
- ***Serial Number:*** Your Paradise VGA Plus Card has a Serial Number label similar to the sample shown below.

PWD003S-PLUS MADE IN
61-603011-00 BRISBANE

E 8 7 1 1 0 0 2 3 5 7

Locate the Serial Number label on your Paradise VGA Plus Card (it may be on the back of the board), and make a note of the multiple letter and number code below the bar code. This code is the board's serial number. In the event that you have to contact us with questions about the operation of your Paradise VGA Plus Card, please have this number available for reference.

Paradise VGA Plus Card and Computer System Compatibility

The Paradise VGA Plus Card is compatible with the IBM PC/XT/AT family of computers as well as computers that are 100% compatible with the IBM offerings. Any compatible system that is capable of operation with the IBM PS/2 Display Adapter will work with the Paradise VGA Plus Card. Most computer systems that will support the use of an EGA card should work with the Paradise VGA Plus Card without any problems.

The Paradise VGA Plus Card is also compatible with the IBM PS/2 Model 25 and Model 30 computers.

Users of older IBM PC's

Please note: this section applies only to owners of IBM brand PC's. Owners of IBM XT's, PS/2 Model 25's and 30's, AT's and all compatibles may skip to the next section.

The ROM BIOS in very early IBM Personal Computers manufactured by IBM in 1981 or 1982 does not have the ability to recognize the presence of an advanced video display adapter such as an Enhanced Graphics Adapter or the Paradise VGA Plus Card. If you install the Paradise VGA Plus Card in such a system, it will not function until you have upgraded your computer's system board BIOS ROM chips to a new version. BIOS ROM upgrades for the older PC model are available through IBM's authorized dealer network.

The most readily apparent distinguishing feature of this early model is that it has a main system board memory capacity of 64KB as opposed to the 256KB or 640KB that are standard on newer machines. The supplied diskette includes a program called ROMCHECK.COM. This program will check the date of the BIOS ROM chips in your PC and display it on the screen. If the date returned by the program is earlier than October 27, 1982, you will need to replace the BIOS ROM chips with a more current version.

Paradise VGA Plus Card and Monitor/Software Compatibility

The Paradise VGA Plus Card provides support for the IBM Personal System/2 analog displays, models 8503, 8512 and 8513 and compatibles, as well as multi-frequency monitors.

The Paradise VGA Plus Card is compatible with software written for the following video standards:

- ***VGA:*** the built-in video function of the IBM PS/2 Models 50, 60, and 80 and the IBM Personal System/2 Display Adapter,
- ***MCGA:*** the built-in video function of the IBM PS/2 Models 25 and 30,
- ***EGA:*** the IBM Enhanced Graphics Adapter,
- ***CGA:*** the IBM Color/Graphics Adapter,
- ***MDA:*** the IBM Monochrome Display Adapter,
- ***Hercules graphics:*** the Hercules Graphics Card.

The Paradise VGA Plus Card can run software written for any of the display standards listed above on any supported display type. This means you can run "monochrome" software and "color" software on the same monitor. Access to "monochrome" modes on color monitors and "color" modes on monochrome monitors will depend on the setting of the second lever of the DIP switch on your VGA Plus Card. The next section explains the restrictions on operating the VGA Plus Card with software designed for color and monochrome modes.

Additionally, your VGA card provides the following special modes:

- ***132 column text modes:*** 132 columns by 25 and 43 lines,
- ***800 by 600 graphics.***

The Paradise VGA Plus Card will support the extended resolution 800 by 600 pixel graphics mode on multi-frequency analog monitors. If you are using a multi-frequency monitor, you may need a special 15 pin PS/2 compatible cable.

If you are using a multi-frequency monitor you may want to set lever one of the VGA Plus Card's DIP switch to the ON position as described in the installation instructions later in this manual. This switch tells the software that a multi-frequency monitor is connected and will allow the VGA Plus Card to compensate for the differences between PS/2 fixed frequency displays and some multi-frequency displays. If you have a newer multi-frequency display you may want to experiment between the two settings to determine the best results for your display.

Note: The VGA Plus Card's extended 800 × 600 graphics mode is not supported on the IBM PS/2 8503, 8512, 8513 or 8514 monitors or equivalent fixed frequency displays.

Restrictions on Color and Monochrome Modes

The Paradise VGA Plus Card supports a number of different modes originally designed for different video boards and monitor types. The VGA Plus Card is engineered to support these modes on a single monochrome or color analog monitor with the following restriction on using color modes on monochrome monitors and monochrome modes on color monitors.

The VGA standard has two different ways of supporting color and monochrome modes. The VGA on the IBM PS/2 Models 50, 60 and 80 allows software written for monochrome modes or color modes to run without restriction at any point. This is the PS/2 style VGA implementation.

The VGA supported by IBM's PS/2 Display Adapter add-in card is slightly different. Since the video system is designed for PC/XT and AT systems it must be able to support a second non-VGA video board. Because of this requirement the PC/AT implementation of VGA will not allow software written for monochrome modes to operate on color monitors or software written for color modes to operate on monochrome monitors without first changing the VGA to look like a monochrome or color board respectively. This is the PC/AT type VGA implementation. The software required to switch the board from color to monochrome or vice-versa is part of the included VGAPLUS utility.

The Paradise VGA Plus Card will support either of these two methods of handling VGA mode switching. The PS/2 VGA implementation is easier to use since fewer steps are required to run all your programs. The PC/AT implementation is identical to and thus fully compatible with IBM's PS/2 Display Adapter add-in card. You can choose which type of implementation you wish by setting lever two of the VGA Plus Card's DIP switch when you install your Paradise VGA Plus Card. Detailed instructions for setting the DIP switches on the VGA Plus Card are provided in the installation section of this manual.

Tip: If all this seems confusing, not to worry. The recommended setting is to use the PS/2 type VGA implementation since it is designed to be easier to use and would not affect compatibility under almost all circumstances.

The following table lists the various modes and resolutions available on your Paradise VGA Plus Card.

Mode	Resolution	Simultaneous Colors (1)	Mapping (2)
Monochrome Text	80 columns by 25 rows	—	Monochrome
Color Text	80 columns by 25 rows	16	Color
	40 columns by 25 rows	16	Color
CGA Graphics	320h by 200v (3)	4	Color
	640h by 200v (3)	2	Color
Hercules Graphics	720h by 348v	—	Monochrome
EGA Graphics	320h by 200v (3)	16	Color
	640h by 200v (3)	16	Color
	640h by 350v	16	Color
	640h by 350v	—	Monochrome

Mode	**Resolution**	**Simultaneous Colors (1)**	**Mapping (2)**
VGA Graphics (including MCGA)	320h by 200v (3)	256	Color
	640h by 480v	2	Color
	640h by 480v	16	Color
Paradise Extended Graphics	800h by 600v	16	Color
132 Column Text	132 columns by 25 rows	16	Color
	132 columns by 43 rows	16	Color

(1) Simultaneous colors refers to the number of colors or shades that can be displayed at one time from 262144 possible colors on color displays or from 64 shades of grey on monochrome displays.

(2) This refers to the type of old style display for which the mode was originally designed.

(3) 200 line vertical resolution modes are double-scanned to display 400 lines on screen.

What is 132 Column Mode?

The Paradise VGA Plus Card is capable of displaying text that is 132 columns wide. These special text modes provide screen formats of 132 characters by 25 or 43 lines. This is in contrast to the standard text support of 80 characters by 25. We have provided special drivers for popular application software that supports these modes. Please refer to the *Paradise VGA Plus Card Software Guide* that accompanies this manual for information about the use of these modes.

Limitations of 132 Column Mode:
The 132 column text modes of the Paradise VGA Plus Card require the use of special software drivers either provided with this product or provided with the application. For a list of supported applications, please refer to the *Paradise VGA Plus Card Software Guide* that accompanies this product.

What is Paradise Extended Graphics Mode?

The Paradise VGA Plus Card is capable of displaying graphics at a resolution of 800 pixels wide by 600 pixels high in 16 simultaneous colors. This special graphics mode is designed to run on a multi-frequency monitor. We have provided special drivers for popular application software that supports these modes. Please refer to the *Paradise VGA Plus Card Software Guide* that accompanies this manual for information about the use of these modes.

Limitations of Paradise Extended Graphics Mode:
The extended graphics mode of the Paradise VGA Plus Card requires the use of special software drivers either provided with this product or provided with the application. For a list of supported applications, please refer to the *Paradise VGA Plus Card Software Guide* that accompanies this product. The 800 × 600 graphics mode is not supported on the IBM PS/2 8503, 8512, 8513 or 8514 monitors.

Default Configurations of the Paradise VGA Plus Card

The Paradise VGA Plus Card will automatically configure itself to VGA text mode on power up. If you are using the Paradise VGA Plus Card with the IBM PS/2 8503 Monochrome Display or equivalent, the board will default to "monochrome" text mode. Otherwise the board will configure to 80 column color text mode. If you will be using the Paradise VGA Plus Card in conjunction with another video board and monitor combination or with a computer system that has a built-in video function, please refer to Appendix A for information on the limitations of such configurations.

Installing the Paradise VGA Plus Card

The Paradise VGA Plus Card is designed to be easy to install and use. The Paradise VGA Plus Card requires very little configuration. All you need to do to prepare the VGA Plus is set two switches and check a jumper on the board.

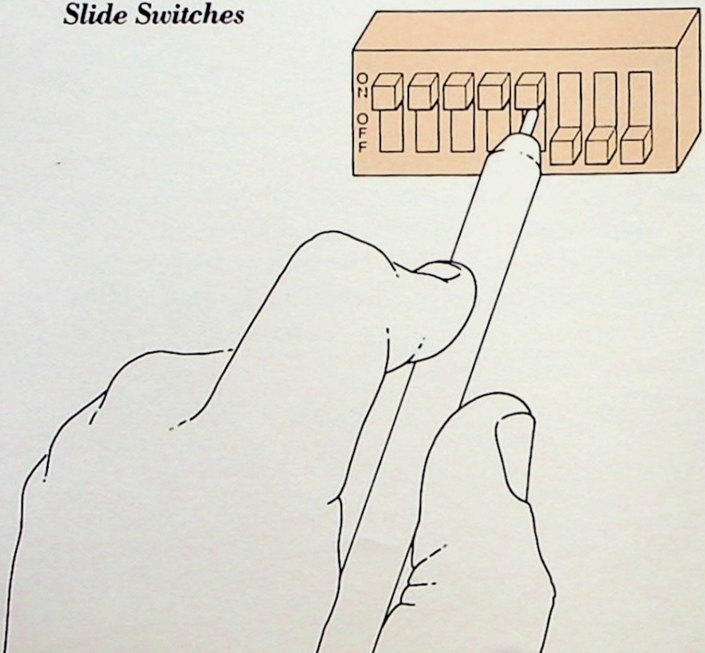
Tools You Will Need

To install the Paradise VGA Plus Card, you will need a medium size flat blade screwdriver or a 3/16" nutdriver or wrench.

How to Set DIP Switches

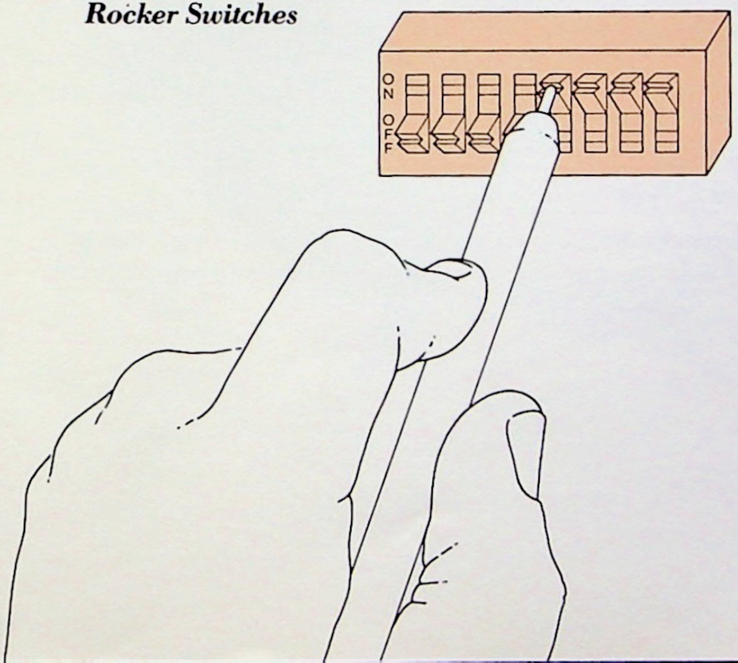
This manual makes reference to switches with rows of levers called DIP switches. You will find these switches on the Paradise VGA Plus Card as well as on the system board of some computers. These switches come in several styles including slide switches and rocker

Slide Switches



switches. Refer to the figure below for a detailed view of how to set these switches. The ballpoint pen in each illustration is turning a lever to the ON position. Some styles of DIP switches use the designations OPEN and CLOSED instead of OFF and ON, respectively.

Rocker Switches



Set the DIP Switch on the Paradise VGA Plus Card

Refer to the prior discussion on setting DIP switches. The Paradise VGA Plus Card has a DIP switch to allow you to tell the card what features to use. The first switch (lever 1) tells the Paradise VGA Plus Card to use special timing for multi-frequency monitors or to use standard VGA timing for fixed frequency PS/2 monitors and some newer multi-frequency displays. The multi-frequency monitor setting will allow most video modes to be displayed on some brands of multi-frequency monitors using a larger screen area than standard PS/2 timing will allow. Some newer multi-frequency monitors will work better using the PS/2 monitor timing. You may want to experiment with the two settings to determine the best results for your particular brand of multi-frequency display.

Note: If you are using an IBM PS/2 display or equivalent fixed frequency display you must select PS/2 compatible display timing by setting lever 1 to the OFF position.

Lever 2 selects the manner in which the Paradise VGA Plus Card handles switching between color and monochrome VGA modes. You will normally want to set lever 2 to the ON position to select the PS/2 style VGA implementation. Please refer to the discussion earlier in this manual regarding restrictions on color and monochrome modes for more information on setting this option. The remaining two switches are reserved for possible future use and should normally be set to the OFF position.

DIP Switch Settings

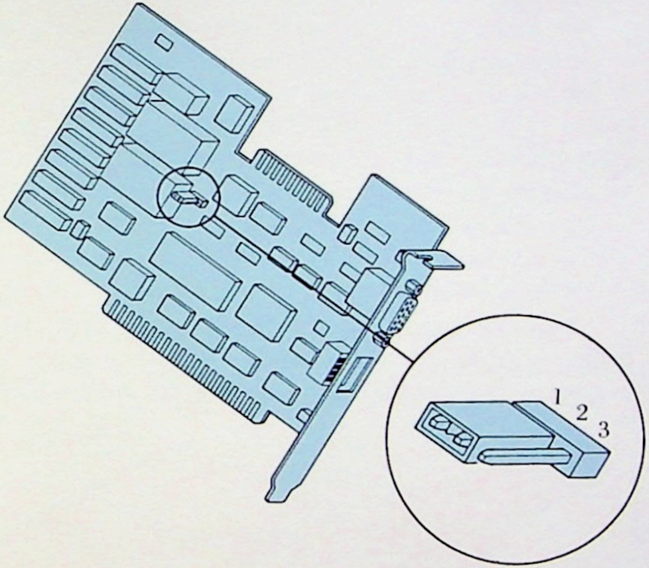
Lever 1	**Monitor Type**
ON	Special multi-frequency display timing
OFF	Standard PS/2 compatible fixed frequency display timing

Lever 2	**VGA Implementation Type**
ON	PS/2 style—all VGA modes available on any monitor (recommended setting)
OFF	PC/AT style—color modes on color monitors, mono modes on mono monitors

Levers 3 and 4 are currently not used and should be set to the OFF position.

Check the Feature Connector Clock Jumper

Make sure that the Feature Connector Clock Jumper "W1" is set on pins 1 and 2 as shown in the illustration.



IBM PS/2 Model 30 and Model 25 Users

Please consult the "Installing Your Options" section of the *IBM PS/2 Guide to Operations* for specific information on opening your computer system and installing add-on adapter cards such as the Paradise VGA Plus Card. Installing the Paradise VGA Plus Card in the Model 30 or 25 will automatically disable the system board video connector. The Paradise VGA Plus Card will handle all video functions, and the connector on the Paradise VGA Plus Card will supply all video output. The PS/2 Models 25 and 30 should not require any special configuration to use the Paradise VGA Plus Card.

Preparing Your Computer for the Paradise VGA Plus Card

You must perform several steps before you install your Paradise VGA Plus Card in your computer system. This section outlines procedures required prior to actual physical installation of the Paradise VGA Plus Card in your computer system.

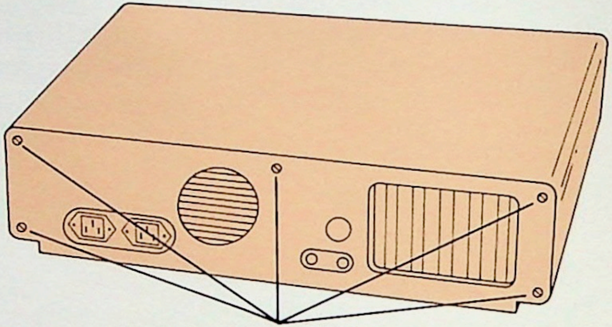
IBM PC, XT, AT and Compatible Users

The illustrations that follow are specific to the IBM PC, XT and AT computers, but most PC compatible computers are similar in design. If you install the Paradise VGA Plus Card in a non-IBM system, please consult your system user's guide for specifics.

Open Up Your Computer System

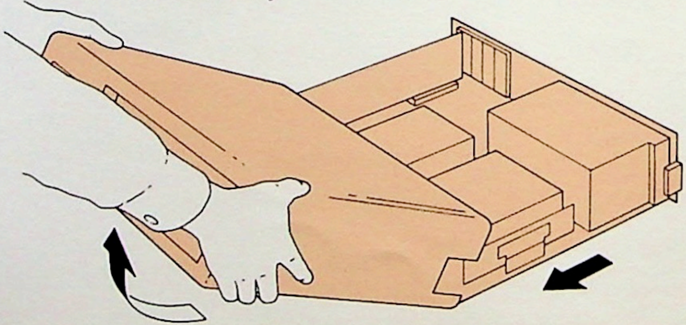
Before you open your system, be sure that you have turned off your system unit and all devices connected to it. It is also a good idea to disconnect all cables from the back of the system. This will give you more room to work.

The following figure illustrates the locations of the cover mounting screws on an IBM PC computer. All cover mounting screws are located on the back of the computer. Remove these screws.



Cover Mounting Screws

Carefully slide the system unit cover forward. When the cover will not go any further, tilt it up as shown below and lift it away.



Configuring Your Computer for the Paradise VGA Plus Card

IBM AT, IBM XT-286 and AT Compatible System Users: The IBM AT and AT look-a-like computers use a program typically called SETUP to tell the computer what equipment is installed in your system. The SETUP program is usually part of the package of programs provided with your AT or AT compatible computer. Your *Guide To Operations* (or equivalent manual) will explain the use of the SETUP program. Proceed to the physical installation of the Paradise VGA Plus Card, then follow the instructions for using the SETUP program.

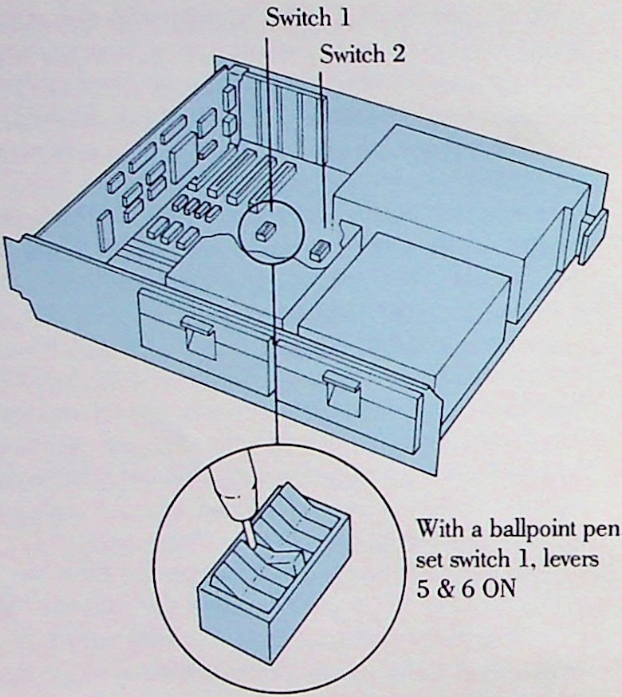
PC, XT and Compatible Users: DIP switches tell the computer about the various options and accessories installed in the system. Successful installation of the Paradise VGA Plus Card depends upon the proper setting of these switches. General instructions on setting DIP switches are provided at the beginning of this section.

In the IBM PC, XT and most compatible computers, levers 5 and 6 of switch 1 on the system board control the functions that affect the operation of the Paradise VGA Plus Card. Refer to the following figure for the location of switches 1 and 2. Switch 2 does not appear on the system boards of XT type computers.

All Users: Before you change any switch settings in your computer, please jot down the current settings. If you run into any difficulties, you can restore your system to its previous operational status.

Levers 5 and 6 of Switch 1 tell the system what video adapter card to expect. When the Paradise VGA Plus Card is installed, set both levers 5 and 6 of Switch 1 to the ON position. This tells the computer system to expect a video board with a BIOS ROM such as the Paradise VGA Plus Card or an EGA. Some compatible systems will refer to this setting as "Reserved."

Your system is now ready to receive the Paradise VGA Plus Card. If you wish to install the Paradise VGA Plus Card in a two monitor system, please refer to Appendix A of this manual for instructions and information on limitations.



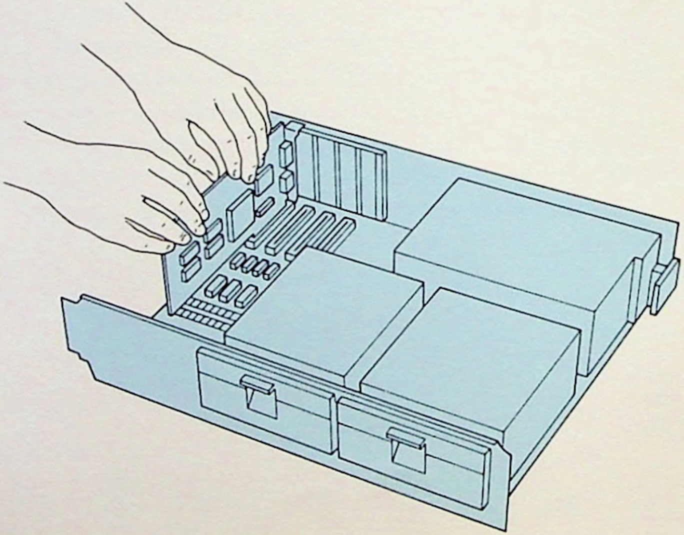
With a ballpoint pen, set switch 1, levers 5 & 6 ON

Installing the Paradise VGA Plus Card in Your Computer System

IS THE POWER OFF?

Refer to the figure below. If necessary, remove a system expansion slot cover by removing its retaining screw and lifting it out. Save the screw.

- Hold the Paradise VGA Plus Card by its top corners and slide it into the system unit. Make sure that the Paradise VGA Plus Card is fully seated in the expansion slot.
- Secure the Paradise VGA Plus Card with the screw that you removed in the step above.



Before You Close Up, Check Your Work

- Did you properly set your computer's system switches and the switches and jumper on the Paradise VGA Plus Card?
- Replace and secure the system cover.
- Plug your PS/2 compatible display into the 15 pin "D" shaped video connector at the rear of the Paradise VGA Plus Card.

  Important note: If you are using a multi-frequency monitor, you will need a special PS/2 compatible adapter cable, and you will need to make sure that your multi-frequency monitor is configured properly for a PS/2 compatible analog VGA signal. Check with your display equipment dealer or display manufacturer for more information on configuring your monitor.

IBM AT, XT-286 and Compatible Users: After you have physically installed the Paradise VGA Plus Card in your AT compatible system, use the SETUP program supplied with your system to tell your computer about the equipment installed in your system. When using AT and compatible SETUP programs with the Paradise VGA Plus Card, please follow these steps:

- Run SETUP to configure your system. When you arrive at the part of the program where video support is specified, the program may ask you if the monitor you are looking at will be the primary monitor. Answer YES. If you are presented with a list of video options, select the option for "EGA" support since your Paradise VGA Plus Card will look to some systems like an EGA card. If you don't see an option for "EGA," try the option for "NO MONITOR," "RESERVED" or "SPECIAL." These will usually work. If not, see your dealer. At the conclusion of the SETUP program, the computer will restart as if you had just turned on the power.

All Users: Your Paradise VGA Plus Card installation is now complete. If you have any problems, please refer to the troubleshooting guide later in this manual for assistance.

If You are Using an Expanded Memory (EMS) Board: The Paradise VGA Plus Card occupies the same memory locations as standard EGA cards plus an additional 16K for the extended video BIOS. You must be sure that your EMS board does not conflict with these memory locations. Check with the manufacturer of your EMS board for information on configuring your EMS board for use with a VGA compatible video board. The computer system locations occupied by the Paradise VGA Plus Card range from "A000" through "C7FF." You may need to exclude these locations from use by your EMS driver. You can usually designate these exclusions when invoking your EMS driver. Again, check with the manufacturer of your EMS board for information should you have problems.

Using the Paradise VGA Plus Card

If you have followed the installation instructions in this manual, you are now ready to use your Paradise VGA Plus Card equipped computer system. Most software that is compatible with IBM's Personal System/2 or EGA card will run automatically on your system with the Paradise VGA Plus Card. Just turn on your computer system, install your application package for "PS/2 Model 50, 60 or 80 video," "VGA," or "EGA" as instructed by the software manufacturer.

Configuring your Application Software

Many application software packages include a setup, installation or configuration program to prepare them for operation on the particular hardware that comprises your system. Most newer software will be able to run in the default "VGA" configuration of the Paradise VGA Plus Card.

However, since some software packages are written specifically for certain non-EGA, non-VGA video hardware, it may be necessary to configure the Paradise VGA Plus Card to behave identically at a hardware level to the video board needed by this software. For this purpose we have included a handy utility program that allows you to configure your Paradise VGA Plus Card to behave identically to each of the standard video boards emulated by the Paradise VGA Plus Card. This utility is called VGAPLUS and is described in the following section.

The following table lists the fully hardware compatible video standards supported by the Paradise VGA Plus Card and the video modes and resolutions that are available under each video standard.

	Standard Mode	**Resolution**	**Simultaneous Colors (1)**	**Mapping (2)**
VGA, PS/2 Display Adapter including MCGA and EGA modes *(power-on default)*	Mono Text	80 columns by 25 rows	—	Monochrome
	Color Text	80 columns by 25 rows	16	Color
		40 columns by 25 rows	16	Color
	132 Col. Text (4)	132 columns by 25 rows	16	Color
		132 columns by 43 rows	16	Color
	Graphics	320h by 200v (3)	4	Color
		640h by 200v (3)	2	Color
		320h by 200v (3)	16	Color
		640h by 200v (3)	16	Color

	Standard Mode	Resolution	Simultaneous Colors (1)	Mapping (2)
		640h by 350v	16	Color
		640h by 350v	—	Monochrome
		320h by 200v (3)	256	Color
		640h by 480v	2	Color
		640h by 480v	16	Color
	Paradise Graphics (4)	800h by 600v	16	Color
CGA, Color/Graphics Adapter	Color Text	80 columns by 25 rows	16	Color
		40 columns by 25 rows	16	Color
	Graphics	320h by 200v (3)	4	Color
		640h by 200v (3)	2	Color
Hercules Graphics Card	Mono Text	80 columns by 25 rows	—	Monochrome
	Graphics	720h by 348v	—	Monochrome

(1) Simultaneous colors refers to the number of colors or shades that can be displayed at one time.

(2) This refers to the type of old style display for which the mode was originally designed.
Note: Color and monochrome modes are available on all displays connected to Paradise VGA Plus Card.

(3) 200 line vertical resolution modes are double-scanned to display 400 lines on screen.

(4) These modes require use of application specific drivers included with your Paradise VGA Plus Card.

Here are a few installation tips:

- The best looking display can usually be achieved by installing your application software packages for the highest resolution mode available.
- Some applications automatically detect what kind of video card/monitor combination is installed and configure themselves to take best advantage of the available hardware.
- Install your software for a VGA, PS/2 video or EGA if possible. This will allow your software to run on the Paradise VGA Plus Card in its startup configuration.
- If your software does not specify a VGA, PS/2 or EGA option, try the default color option, if available. Usually this will work in the Paradise VGA Plus Card's default color mode.
- If your software still does not display video properly, try using the VGAPLUS utility to set the Paradise VGA Plus Card to a completely hardware compatible video standard that is supported by your software such as CGA or Hercules. The VGAPLUS utility is described in the following section.

Notes:

- The only way that the Paradise VGA Plus Card will run software that requires hardware compatibility with a video standard other than VGA is to configure the board to operate in that mode by way of the VGAPLUS utility.
- Hercules compatible software and many CGA compatible games will require using the VGAPLUS utility to set the Paradise VGA Plus Card to the appropriate video standard.
- Software that requires a specific video mapping may require using the VGAPLUS utility to set the Paradise VGA Plus Card to color or monochrome VGA mode as needed. The setting of the second switch lever on the Paradise VGA Plus Card will determine if all VGA modes are automatically available on either monochrome or color monitors or not. For example, if the Paradise VGA Plus Card is set for a PC/AT style VGA implementation per the board's DIP switch and the board is connected to a color monitor, you may need to use the VGAPLUS utility to switch modes to run software which will only run in "monochrome" text mode. If the Paradise VGA Plus Card is set for a PS/2 style VGA implementation via the board's DIP switch then the "monochrome" text mode will be automatically available.

Paradise VGA Plus Card Software

The enclosed diskette contains several programs designed to help you get the most out of your VGA Card. Specifically:

- ROMCHECK.COM allows users of earlier IBM PC computers to determine VGA compatibility.
- VGAPLUS.EXE allows users to select the video hardware standard of the card either from a menu or directly from the DOS prompt line.
- Various drivers that let popular application software packages take advantage of the Paradise VGA Plus Card's 132 column text modes and 800 by 600 graphics are supplied on the enclosed disk. Please refer to the *Paradise VGA Plus Card Software Guide* supplied with this product for details.

ROMCHECK.COM: As described earlier in this manual, the BIOS on your computer's system board must recognize the presence of the BIOS extensions supplied as part of the Paradise VGA Plus Card. Early IBM PC's (those with BIOS's dated before October 27, 1982) do not have this capability. ROMCHECK.COM is a program that you may use to determine the BIOS date of your system.

To invoke this program, simply start your computer system. At the DOS prompt, insert the diskette in drive A and type:

```
A:ROMCHECK [ENTER]
```

Note: You don't have to install the Paradise VGA Plus Card in your system before you use ROMCHECK.COM. Although you may use this program in most IBM compatible computers, the October 1982 "compatibility date" only holds true for IBM PC computers.

VGAPLUS.EXE: This program lets you take control of the current video standard that the Paradise VGA Plus Card is emulating. The default video standard of the Paradise VGA Plus Card is always VGA. VGAPLUS.EXE lets you override this setting enabling you to choose between VGA, CGA or Hercules video standards as well as switch between color and monochrome modes.

VGAPLUS.EXE also lets you LOCK the board into a particular configuration in order to re-boot to that configuration rather than the default VGA mode.

To invoke this program, simply start your computer system. At the DOS prompt, insert the enclosed diskette in drive A and type:

A:VGAPLUS [ENTER]

You will see a simple menu listing some of the options available to you. Use the up and down arrows to select the feature you wish to access. When you select the desired feature (highlighted and blinking), press the [ENTER] key. Choose "Exit to Operating System" or press the [ESC] key to quit.

You may also use VGAPLUS.EXE from the DOS prompt line bypassing the menu. This is useful if you wish to incorporate VGAPLUS.EXE commands into a batch file.

This is how you can set the various VGAPLUS.EXE parameters from the DOS prompt:

VGAPLUS [ENTER]	Brings up the VGAPLUS menu.
VGAPLUS VGA [ENTER]	Sets the card to VGA operation. This is the default configuration of the Paradise VGA Plus Card.
VGAPLUS CGA [ENTER]	Sets the card to CGA operation. This mode emulates the video capabilities of the IBM Color/Graphics Adapter. A warm boot (Control-Alt-Del key sequence) will bring you back to VGA mode.

VGAPLUS MDA [ENTER]	Sets the card to emulate the Hercules Graphics Card with no graphics memory allocated. This configuration is equivalent to IBM's text only Monochrome Display Adapter. A warm boot (Control-Alt-Del key sequence) will bring you back to VGA mode.
VGAPLUS HERC0 [ENTER]	Sets the card to emulate the Hercules Graphics Card with one page of graphics memory allocated. This configuration is equivalent to using the Hercules HGC HALF command. A warm boot (Control-Alt-Del key sequence) will bring you back to VGA mode.
VGAPLUS HERC1 [ENTER]	Sets the card to emulate the Hercules Graphics Card with both pages of graphics memory allocated. This configuration is equivalent to using the Hercules HGC FULL command. A warm boot (Control-Alt-Del key sequence) will bring you back to VGA mode.
VGAPLUS COLOR [ENTER]	Changes the board to color mapping as needed. Allows board to use video modes that require color mapping.
VGAPLUS MONO [ENTER]	Changes the board to monochrome mapping as needed. Allows you to use video modes that use monochrome mapping such as monochrome text mode.
VGAPLUS 13225 [ENTER]	Switches the board to color 25 line 132 column text mode. This mode is only for use with specific application programs that have been designed to take advantage of this mode's extended text capabilities. See the accompanying *Paradise VGA Plus Card Software Guide* for information on such programs.

VGAPLUS 13243 [ENTER]	Switches the board to color 43 line 132 column text mode. This mode is only for use with specific application programs that have been designed to take advantage of this mode's extended text capabilities. See the accompanying *Paradise VGA Plus Card Software Guide* for information on such programs.
VGAPLUS LOCK [ENTER]	Locks the current video standard so that it will survive a warm boot. Can be used in conjunction with another parameter to lock that particular mode. Example: VGAPLUS CGA LOCK will allow the board to survive a re-boot with the board configured as a color/graphics adapter.
VGAPLUS REBOOT [ENTER]	Locks and re-boots the currently selected video standard so that the system will re-initialize in the current video standard. This command is equivalent to the VGAPLUS LOCK command followed by a soft re-boot (Ctrl-Alt-Del sequence). Can be used in conjunction with another parameter to lock and re-boot that particular mode. Example: VGAPLUS HERC1 REBOOT will switch the board to Hercules mode and re-boot the system in Hercules mode. The board will be locked in the selected mode until the VGAPLUS utility is used again to select a different mode. This option should be used for changing the video standard when sophisticated drivers or TSR utilities are loaded into the system memory. (See note on following page) When the system re-boots, these drivers or utilities will need to be reloaded under the selected mode.

Any specific video mode command such as VGAPLUS CGA will unlock the card unless used with the LOCK parameter. If you make a mistake in typing the VGAPLUS command, the program will give you the option of using the VGAPLUS menu or returning to DOS.

Copy protection: None of the programs we supply are copy protected in any way. You may use the DOS COPY command to copy them to a diskette or hard disk. We recommend that you make a back up copy of your *Paradise VGA Plus Card Utility Disk.*

Note to Microsoft* and IBM PS/2 mouse users: If you are installing your mouse driver by way of a program such as MOUSE.COM or have your mouse driver installed through the CONFIG.SYS file, you may have problems when using the VGAPLUS utility to switch to non-VGA Hercules, CGA or MDA modes.

When using the Microsoft Mouse driver version 6.1 or the IBM PS/2 Mouse driver version 1.0 you will need to use a special procedure when switching from VGA mode to Hercules or CGA modes. Rather than choosing "Set Hercules Mode" then "Exit to DOS," you should choose "Set Hercules Mode" then execute the menu option to "Reboot System in Current Mode." This option will allow your system to re-initialize in the selected video mode. At this point you should re-install your mouse, or if your mouse is installed in CONFIG.SYS, it will re-install automatically. You may also choose the option to "Reboot System in Current Mode" from the DOS command line with the statement VGAPLUS REBOOT.

Troubleshooting Your Paradise VGA Plus Card Installation

Here are some typical symptoms and solutions to installation problems:

Symptom	**Solution**
One long beep & two short beeps on power up of system.	Levers 5 and 6 of system board DIP switch 1 not correctly set for the Paradise VGA Plus Card. Be sure that both levers 5 and 6 are in the ON position.
Same as above.	Paradise VGA Plus Card not properly seated in expansion slot or expansion slot connector is dirty. Reseat or clean "gold fingers." A pencil eraser works well.
No display.	System not configured appropriately for the Paradise VGA Plus Card. See the installation section of this manual for details.
Same as above.	Monitor signal and/or power cable not properly plugged in.
Same as above.	Monitor not turned on.
Same as above.	Brightness and/or contrast controls on monitor not turned up far enough.
F1 CRT or SETUP error in an AT type computer on startup.	SETUP program not run. See installation instructions supplied with your computer and installation section of this manual.

Symptom	Solution
Screen displays distorted images or screen goes blank when software is executed.	Software not configured for or compatible with board's current video standard configuration. Re-configure software for VGA or EGA video or set Paradise VGA Plus Card to video standard supported by software. See "Using the VGA Plus" section of this manual.
Same as above.	Software is configured for a "color" mode and board is currently operating in "monochrome" mode or vice-versa. Use VGAPLUS utility to change mapping of board.
Diagnostics give a 2401 Video Error or some other video error.	The diagnostics disk that you are using does not know about the existence of VGA and is testing the Paradise VGA Plus Card as if it were an EGA or some other type of video card. Most diagnostics programs do not know how to properly test the Paradise VGA Plus Card. This error does not mean that the Paradise VGA Plus Card is malfunctioning.

Appendix A—Two Monitor Systems and Systems with Built-in Video

Two Monitor Systems

The Paradise VGA Plus Card may be used in conjunction with another video board and monitor combination. The second video card and monitor pair must be either a monochrome display adapter and a monochrome monitor or a color/graphics adapter and RGB color monitor. These are the only multiple monitor/video card installations that will work with the Paradise VGA Plus Card.

Notes:

- When you install the Paradise VGA Plus Card with another video adapter, you are restricted in the use of your Paradise VGA Plus Card to modes that do not conflict with those of the complimentary video board. IBM systems will only allow one video card to be mapped as a monochrome card and one to be mapped as a color card.

  Thus if you use the Paradise VGA Plus Card in conjunction with a monochrome display adapter and monochrome monitor, the Paradise VGA Plus Card will be limited to color mapped modes. The monochrome text mode, Hercules graphics and MDA modes will not be available on the Paradise VGA Plus Card.

  If you are using the Paradise VGA Plus Card in conjunction with a color/graphics adapter and RGB monitor, the Paradise VGA Plus Card will be limited to monochrome operation. Color modes will not be available on the Paradise VGA Plus Card.
- The Paradise VGA Plus Card is always the primary video display adapter. When the system boots up or re-boots, the Paradise VGA Plus Card is always the default display.
- Use DOS' MODE command to switch between the two video cards.
- Regardless of whether you are installing a single or two video card system, always set system board switches (PC's, XT's and compatibles) or run the SETUP program (AT's or compatibles) as if your were installing an "EGA" or "VGA" card.
- You cannot use the Paradise VGA Plus Card in conjunction with an EGA card of any type.

Systems with Built-in Video

Some IBM compatible systems come with built-in video functions. If you are attempting to install the Paradise VGA Plus Card in a system that features a built-in video function, you will need to make some special considerations.

If you want to be able to use the complete range of compatible video modes available with your Paradise VGA Plus Card, you will have to completely disable your system's built-in video function. This procedure may require physically removing an add-on board from one of the expansion slots or changing some DIP switch or jumper settings. Please refer to the documentation that came with your computer system, or check with the dealer/manufacturer for the information you will need to prepare your computer system for use with "an EGA" or "a VGA compatible video board."

If your compatible system has a built-in video function that is equivalent to the IBM Monochrome Adapter or the IBM Color/Graphics Adapter, you may be able to use the built-in video in conjunction with the Paradise VGA Plus Card as described above in the section on two monitor systems. Treat the built-in video as if it were a standard monochrome card or color/graphics adapter.

Some systems may have a built-in video function that is compatible with the Hercules graphics standard. Such a video adapter can co-exist with the Paradise VGA Plus Card when the built-in video is configured for IBM MDA memory mapping (sometimes referred to as "diag" mode) or the equivalent of Hercules HGC HALF graphics mode. In general Hercules compatible adapters should be treated as if they are a standard monochrome card. Note: you will not be able to make use of software that requires the Hercules HGC FULL graphics mode.

Appendix B—A Short Glossary

Analog Monitor: A variety of video display that uses continuously variable color control voltages to allow an extremely large number of colors to be displayed while requiring only a few inputs. The IBM PS/2 Displays, models 8503, 8512 and 8513 are analog monitors.

BIOS or ROM BIOS: Acronym for Basic Input-Output System. These are the programs that are permanently stored in your computer system in ROMs (Read Only Memory) providing the power-on self test and the ability to recognize and use the Paradise VGA Plus Card in your system.

CGA: The IBM Color/Graphics Adapter.

Color Display: A type of monitor capable of displaying information in color, sometimes referred to as an RGB monitor. The letters R, G, and B refer to the arrangement of electrical signals necessary to drive this device and to the primary colors; red, green and blue from which all other colors are derived. The Paradise VGA Plus Card is capable of displaying 64 different levels of red, green and blue on a color display. The combinations of these red, green and blue signals allow 262144 different possible colors to be displayed.

Default Mode: We define a mode of operation as the set of capabilities and resolutions currently available as well as the current display mode. The default mode refers to the manner in which the Paradise VGA Plus Card operates upon system start up when no software has been run to change to another display mode. The default mode of the Paradise VGA Plus Card is always VGA text mode unless you use the VGAPLUS utility to lock or re-boot the board in some other mode.

Driver: A driver usually refers to the part of a software application program that deals with a specific piece of equipment in the system. Some applications have different drivers for different types of video boards. The Paradise VGA Plus Card includes drivers to allow several popular software packages to use the 132 column text and 800 by 600 graphics modes. See the *Paradise VGA Plus Card Software Guide* for more information on installing and using the drivers supplied with the Paradise VGA Plus Card.

EGA: The IBM Enhanced Graphics Adapter. Because of the similarities between EGA and VGA it will often be necessary to treat your Paradise VGA Plus Card as if it is an EGA.

Expansion Slot Connector: This is a bus into which the Paradise VGA Plus Card is connected. Through this connector the Paradise VGA Plus Card communicates with the computer system. The Paradise VGA Plus Card will connect into the expansion slots in PC or AT type computers. The Paradise VGA Plus Card will not connect to the expansion slots of the IBM PS/2 Models 50, 60 and 80.

Fixed Frequency Monitor: An analog monitor that operates using a fixed horizontal sync frequency. Vertical sync frequency is variable to change the resolution displayed on screen. The IBM PS/2 displays, models 8503, 8512 and 8513 are fixed frequency monitors.

Hercules Graphics: Hercules graphics is a video mode that provides bit mapped single color graphics at a resolution of 720 horizontal pixels by 348 vertical pixels.

MCGA: The built-in video function supplied on the IBM PS/2 Models 25 and 30 computers. This mode provides CGA compatibility as well as two additional modes: a 640 by 480 two color mode and a 320 by 200 mode with 256 colors.

MDA: The IBM Monochrome Display Adapter.

Mapping: Mapping refers to area in the computer's memory where a particular video mode stores its data. On older style video cards information for a monochrome monitor is mapped in a different location in memory than color monitor information. The VGA standard allows all video modes to be displayed on all monitors so the mapping is no longer dependent on the type of monitor being used. However, you must pay attention to the current mapping of the Paradise VGA Plus Card to ensure that your software is configured properly for the currently available modes. Refer to the sections on using the Paradise VGA Plus Card and monitor/software compatibility.

Monochrome Display: A type of monitor that displays video information in a single color. The IBM PS/2 model 8503 is a monochrome analog display. It can display 64 different shades. The Paradise VGA Plus Card defaults to monochrome mapping when used with a monochrome monitor.

Multi-frequency Monitor: A monitor that will allow variable horizontal and vertical sync frequencies. Such a monitor will typically support a large range of video signals. A multi-frequency monitor is required to support the 800 by 600 dot extended resolution graphics mode of the Paradise VGA Plus Card.

Primary Display: In a two monitor system, the one that is active when you start the system. The primary display is always the Paradise VGA Plus Card.

VGA: The video standard supported on IBM's PS/2 computer systems and the IBM PS/2 Display Adapter. The VGA video standard drives analog display monitors and provides access to 262144 different colors on color monitors.

Appendix C—Warranty and Service Information

Paradise VGA Plus Card Compatibility Guarantee

During the warranty period, if any VGA compatible software application fails to run on an IBM PC/XT/AT with the Paradise VGA Plus Card, but will run on the same IBM PC, XT or AT system with an IBM PS/2 Display Adapter (without any additional video controller cards), Paradise will replace the board with one that runs the software or refund your money.

Paradise Systems Limited Warranty

Paradise Systems, Inc., warrants this Paradise Systems product to be in good working order and free from defects in materials and workmanship for a period of three years from the date of delivery to the customer. Paradise Systems liability shall be limited to replacing or repairing, at its option, any defective product.

Defective products must be returned freight prepaid to Paradise's plant at 99 South Hill Drive, Brisbane, California 94005, or other locations specified by Paradise, but in no case is any product to be returned to Paradise Systems, Inc., without first obtaining written permission of Paradise Systems, Inc. Paradise Systems, Inc. shall not be responsible for shipping charges, nor for any loss or damage to the product occurring during the return. Products which have been subject to abuse, misuse, alteration, neglect or unauthorized repair or installation are not covered by this warranty. Paradise Systems, Inc. shall make the final determination as to the existence and cause of any alleged defect. No warranty is made with respect to custom products produced to the customer's specifications except as specifically stated in writing by Paradise Systems, Inc.

THIS WARRANTY IS IN LIEU OF ANY OTHER WARRANTY EXPRESS OR IMPLIED. PARADISE SYSTEMS, INC. MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR OF MERCHANTABILITY. IN NO EVENT SHALL PARADISE SYSTEMS, INC. BE LIABLE FOR INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES SUCH AS LOSS OF PROFITS OR BUSINESS OPPORTUNITIES.

How to Obtain Warranty or Non-Warranty Service

If this Paradise Systems product ever needs service, check with your dealer first. If he can't help you please call us at (415) 468-7300.

Warranty and non-warranty service is available from Paradise Systems, Inc. However, no product may be returned to us without first obtaining a RETURN AUTHORIZATION NUMBER. This number may be secured by calling Paradise Systems at: (415) 468-7300. Please have the serial number from your Paradise VGA Plus Card available when you call. (Refer to the section "Layout of Your Paradise VGA Plus Card" earlier in the manual for the location of the product's serial number.) No unauthorized shipments will be accepted.

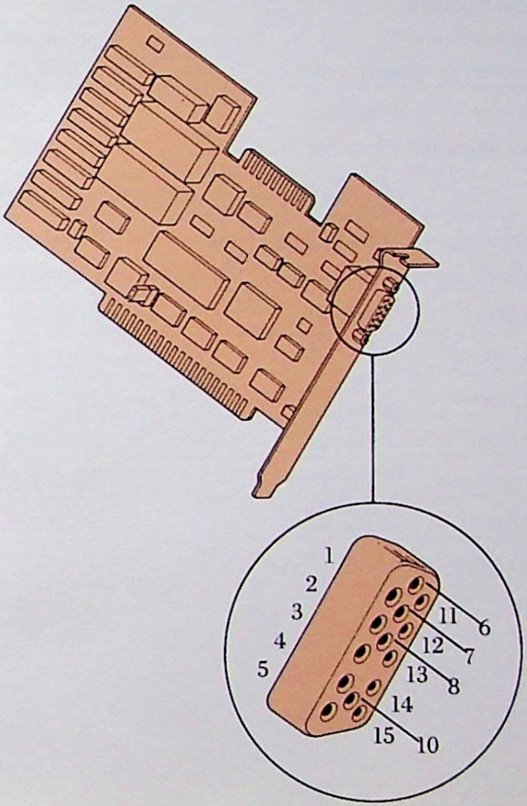
Appendix D—Connector Pinouts and Sync Frequencies for the Paradise VGA Plus Card

Video port connector pinout:

PIN	*Function*
1	Red Video
2	Green Video
3	Blue Video
4	Monitor ID Bit 2 (not used)
5	ground
6	Red Return (ground)
7	Green Return (ground)
8	Blue Return (ground)
9	Key (no pin)
10	Sync Return (ground)
11	Monitor ID Bit 0 (not used)
12	Monitor ID Bit 1 (not used)
13	Horizontal Sync
14	Vertical Sync
15	not used

Monochrome type monitors use Green Video for all video input and ignore Red Video and Blue Video.

Monitor ID Bits are not used on the Paradise VGA Plus Card. Monitor type is determined on power up by an automatic monitor detection circuit.



Video Signals

Black level = 0V
Full intensity level = +0.7V

Sync Signals

	Fixed Frequency Monitors (DIP lever 1 OFF)				Multi-frequency Monitor (DIP lever 1 ON)			
	Horizontal Sync		Vertical Sync		Horizontal Sync		Vertical Sync	
Display Mode	Frequency	Polarity	Frequency	Polarity	Frequency	Polarity	Frequency	Polarity
350 lines	31.5 KHz	+	70.1 Hz	–	31.5 KHz	+	70.1 Hz	–
"200 lines"	31.5 KHz	–	70.1 Hz	+	28.0 KHz	–	62.3 Hz	+
400 lines	31.5 KHz	–	70.1 Hz	+	31.5 KHz	–	62.3 Hz	+
480 lines	31.5 KHz	–	59.9 Hz	–	31.5 KHz	–	59.9 Hz	–
132 column	31.5 KHz	–	70.0 Hz	+	27.6 KHz	–	61.5 Hz	+
600 lines*	35.2 KHz	–	56.2 Hz	–	35.2 KHz	–	56.2 Hz	–

*800×600 graphics

Video feature edge connector pinout:

front (component side)

PIN	***Function***
Y1	C0 (Color Bit 0)
Y2	C1 (Color Bit 1)
Y3	C2 (Color Bit 2)
Y4	C3 (Color Bit 3)
Y5	C4 (Color Bit 4)
Y6	C5 (Color Bit 5)
Y7	C6 (Color Bit 6)
Y8	C7 (Color Bit 7)
Y9	DAC Clock
Y10	DAC Blanking
Y11	Ext. Horizontal Sync
Y12	Ext. Vertical Sync
Y13	ground

back

PIN	***Function***
Z1	ground
Z2	ground
Z3	ground
Z4	Select Internal Video
Z5	Select Internal Syncs
Z6	Select Internal DAC
Z7	not used
Z8	ground
Z9	ground
Z10	ground
Z11	ground
Z12	not used
Z13	not used

Notes:

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